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Member Responses to Their Work Settings

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ABSTRACT

Research has shown that project groups characterized by relatively stable memberships were significantly lower in performance than other project teams. Despite these studies, we have not as yet learned how high performing stable project teams (assuming there are a few) maintain effectiveness over time. The present study, as a result, focuses on whether any project teams have successfully remained high performing with increasingly high levels of group longevity. Furthermore, are certain managerial behaviors particularly important in keeping a stable group creative and high performing? Both of these issues are addressed using data collected from 71 R&D project groups from ten different technology organizations.

One of the most important functions of a group manager is to make sure his team is performing effectively and that it will continue to be effective as members work together over time. Despite these concerns, research studies in professional settings have consistently uncovered significant decrements in project performance when group membership has remained fairly constant over too long a time period. Specifically, the empirical findings of Shepard (1956), Pelz and Andrews (1966), and Katz (1982a) show how project performance varies curvilinearly with group longevity as measured by averaging the individual project tenures of all group members. In all of these studies, project groups with group longevity scores of five or more years were significantly lower in performance than project teams with lower levels of group longevity.

Although this curvilinear relationship between performance and group longevity is now well documented, we must still learn considerably more about the different processes underlying these performance variations. What changes take place within a group that could account for the significantly lower performances of long-tenured project teams? Moreover, is there any chance of keeping a group effective with increasingly high levels of mean group tenure? Furthermore, when one examines the research literature on group dynamics, one discovers that virtually every empirical study is either based on new groups or has failed to differentiate among groups according to how long members have interacted with one another. In short, there is as yet no empirical basis from which to suggest how one might manage increasingly stable project groups in order to maintain creativity and high performance.

As a result, the present study is guided by two broad research questions. The first question is whether there are any project teams that

have successfully remained high performing with high levels of group longevity. The second question -- moot if the first cannot be answered in the affirmative -- is simply which task characteristics and managerial behaviors are important in keeping a stable group creative and high performing.

Group Development

For some time now, theories of group development have been proposed by a variety of researchers, including Parsons (1961), Tuckman (1965), and Schutz (1966). These models have been very useful for describing the developmental concerns and problems of group members as they come and work together over a relatively brief time span. What is missing, however, is a more prolonged developmental view--one geared towards the changes that are likely to take place as project team members adapt to their work settings over a long time period.

Katz (1982b) and Pfeffer (1983) have recently argued, for example, that employees become increasingly committed to and associated with their project activities and decisions the longer they function in their project group contexts. Such commitments, according to Salancik (1977), are likely to grow even stronger as courses of action are chosen and pursued more publicly and voluntarily. Commitment, therefore, escalates with time, for as illustrated by Staw (1976) and Janis and Mann (1977), the more often group members are called upon to execute or justify their problem-solving strategies and decisions, the more ingrained these activities are likely to become. Allison (1971) even warns that continued commitment to established practices and procedures will become highly resistant to change, since such functions become excessively embedded in the norms, roles, and basic

attitudes of project group members. Social expectations also develop that further constrain group members as they become strongly linked to their past judgements, skills, and task accomplishments (Pfeffer, 1981). In reaction to such expectations, project members commit themselves even further through processes of rationalization and self-justification (Staw, 1980). With increasingly high levels of group longevity, then, project members become progressively bounded by their past decisions and behaviors.

Research findings from Pelz and Andrews (1966) and Katz (1982a) also suggest that long-tenured project groups become significantly isolated from critical sources of outside information and important new ideas. As a result, project members become increasingly constrained by the more limited information they see as a consequence of their long-term group memberships. Instead of exposing themselves to new ideas or new modes of behavior, they become complacent about external events and new technological advances.

Based on such developments, it is argued that project members interacting over a long time period create work patterns that are familiar and comfortable, patterns that are retrospectively grounded in established roles, abilities, and problem-solving behaviors (Weick, 1969; Katz, 1980). Gabarro (1977), for example, discovered that most interpersonal relationships stabilized after eighteen months, undergoing relatively little change thereafter. Findings by Katz (1978) further suggest that group members who have been performing their jobs for extended time periods become relatively indifferent to the challenging aspects of their jobs. They prefer, instead, to rely on customary ways of doing things to fulfill their everyday project requirements. With high levels of group longevity, then, increased concern for maintaining relationships and routines reduces the group's receptivity to new task challenges. It is posited, therefore, that

group longevity significantly affects the responsiveness of project members to the challenging characteristics of their project work.

- H1: Group longevity moderates the relationships between project performance and project task characteristics such that these relationships are significantly less positive for long-tenured project groups.

Managerial Functions

After many years of research, Pelz (1967) concluded that R&D professionals and project groups are considerably more effective when they experience essential tensions between sources of stability on the one hand and sources of challenge on the other. If members of long-tenured project groups are no longer responsive to the task characteristics of their project work, and that the work itself has become less of a source of challenge and activation and more of a source of comfort and stability, then what is the source of challenge to which the high performing, long-tenured project groups are responding? One possibility lies in the area of managerial behavior. Empirical investigations of project groups have generally demonstrated that certain managerial functions can be very important in achieving higher levels of overall effectiveness and innovativeness.

Andrews and Farris (1969) and Gemmill and Thamain (1974), have found, for example, that performance of R&D project groups was directly related to the technical competence of the projects' supervisors -- more so than to their human relations skills and behaviors. Likert's (1967) research, in contrast, has focused on the importance of the informational or "linking-pin" role that project managers should play in connecting their groups to other organizational areas. Following this lead, Allen (1977) and Katz and Tushman (1981) showed that technical project groups were considerably more effective when project supervisors were actively

transferring key pieces of information and new ideas into their project groups from critical information sources outside the project group.

Besides these analytical and informational roles, Katz and Allen (1981), Steiner and Ryan (1968), Mintzberg (1973), and others have described a number of decisional roles that need to be carried out to maintain the effectiveness of project groups. Managers, according to these studies, must obtain and allocate appropriate resources, handle disturbances that suddenly arise, effectively mediate conflicts between groups and individuals, and monitor the combined activities of all project members. Schein (1980) also argues that the manager's critical functions must include determining and transmitting the basic goals and tasks to be accomplished and monitoring progress toward these accomplishments.

Finally, most leadership studies have focused on the motivational aspects of supervisory behavior. Over a generation of research has shown that the degree to which a manager is seen as providing support and recognition (the "consideration" dimension) or seen as emphasizing and maintaining high standards of task performance (the "initiating-structure" dimension) can significantly affect project performance, although findings have varied dramatically across studies and theories (Kerr and Schriesheim, 1974; House and Baetz, 1979). Oldham (1976) found that supervisors were effective to the extent they engaged in specific behaviors that directly increased their subordinates' motivation, i.e., when they employed motivational strategies that involved the setting of specific performance goals, provided information and feedback regarding subordinate job performance, and were willing to redesign jobs to assign subordinates more challenging tasks. Other studies have also confirmed the positive influence of these managerial functions on group performance (e.g., Hackman, Pearce, and Wolfe, 1978; Nadler, 1979; Latham and Locke, 1979).

The four broad categories presented here encompass the managerial functions that have been positively related to group performance in prior research. To unravel the mystery of which particular functions might be influential at any given time or setting, Kerr (1977) has proposed the "substitutes for leadership" framework in which the critical role of a leader is to supplement for those deficiencies that confront subordinates within their job situations. As a result, managerial functions are important to the extent they are needed to provide the analytical, informational, decisional, and motivational aspects of work that are missing within the work environment, yet are essential for enhancing group performance. When other organizational factors are available to carry out these managerial functions, they serve as substitutes for leadership in that they mitigate the need for formal leaders to perform them.

One of the most powerful leadership substitutes, as discussed by House (1971) and Kerr (1977), lies in the project tasks being performed. With more challenging tasks, group members may be more motivated not only to perform well but to broaden their skills and information processing activities, thereby, requiring less managerial intervention and control. Underlying this argument, however, is the assumption that group members are responsive to the challenging characteristics of their project work which may not be valid with high group longevity, as hypothesized. Certain managerial functions, then, may be considerably more important with high group longevity than with lower or moderate longevity levels which leads to the following:

- H2: Group longevity moderates the relationships between project performance and managerial behaviors such that relationships will be more positive when group members are less responsive to the task characteristics of their project work.

This hypothesis does not explicitly propose that certain managerial functions will be more important than others with high group longevity. The hypothesis will be explored for supervisory activity belonging to all four categories of managerial behavior.

METHODOLOGY

This study is part of a research program conducted within the R&D facilities of ten large U.S. corporations. In each participating organization, initial meetings were held with upper management in order to identify projects and obtain a complete list of all R&D professionals currently working on each project effort. Brief meetings were then scheduled to distribute questionnaires to each professional individually. Respondents were told to answer all questions only in terms of the project assignment identified on their questionnaire's front page. If this was incorrect, they replaced it with their correct project assignment.

Individuals were asked to complete their questionnaires on their own time during the next week or so. Stamped, return envelopes were provided so that completed forms could be mailed to us directly. These procedures not only ensured voluntary participation but also enhanced high quality data since respondents had to commit their own time and effort. Response rates across organizations was extremely high, ranging from a low of 82% to a high of 96%.

Although these procedures yielded over 2,000 respondents from 185 different project teams, only 71 consisted of a group of professionals, all of whom reported directly to the same project manager. The rest either involved a matrix-type design or contained multiple hierarchies in which group members reported to different project supervisors. Since this study's

unit of analysis is at the project group level, individual perceptions have to be pooled to derive group measures of project tasks and of managerial behaviors. In order not to confound our results by pooling individual perceptions across different project supervisors or different project structures, the analyses reported here will be confined to the 71 aforementioned project groups, ranging in size from 3 to 22 professional members. Project size was not related to any of the main variables in this study.

Finally, professionals indicated on their questionnaires the number of years and months they had been associated with their specific project groups. As in previous studies, group longevity or mean group tenure was calculated by averaging the individual project tenures of all project members. Group longevity, then, does not represent the length of time individuals have been working in that particular problem area, but rather the average length of time the current group of project members has been working and interacting with one another.

Project Task Characteristics

Respondent perceptions of their challenging task characteristics were measured using a slight variant of the Job Diagnostic Survey (JDS) instrument reported by Hackman and Oldham (1975). While the JDS has been extensively used in many different job contexts (Hackman and Oldham, 1980), pretests of the instrument in R&D settings suggested two desirable modifications. First, the items concerning task identity were replaced by several items referring to a dimension labelled task creativity (the degree to which the technical solutions to my work require creative thought and innovativeness). Secondly, the items covering task significance were

factored into more specific domains of organizational significance, professional significance, and societal significance.

The task dimensions were initially measured by averaging individual member responses to the seven-point, Likert-type items. Since project groups are the units of analysis, however, these individual data were pooled across all group members to derive aggregated measures of task dimensions at the project level. As described by Katz and Tushman (1979), analysis of variance was used to ensure the appropriateness of combining individuals' perceptions of their task activities within each project group.

Managerial Functions

To measure the group's perceptions of their project manager, seven-point, Likert-type items were selected from many previous studies to cover the analytical, informational, decisional, and motivational aspects of supervisory activity. The analytical function was measured by averaging individual member responses to questionnaire items along the two interrelated dimensions of: (1) technical competence (the degree to which the project manager is skilled and knowledgeable about the project's technical activities) and (2) idea generation and review (the degree to which the project manager is effective at generating and reviewing problem-solving ideas and solution strategies). The information function was measured along the dimensions of: information dissemination (the degree to which the project manager disseminates important and relevant information); (2) organizationally connected (the degree to which the project manager has important and useful contacts with other professionals within the organization); and (3) professionally connected (the degree to which the project manager is up-to-date professionally and keeps in touch with other

R&D professionals outside the organization). Decisional functions were measured along the three dimensions of: (1) disturbance handler (the degree to which the project manager is able to recognize and deal with conflict situations); (2) resource allocator (the degree to which the project manager obtains those resources necessary for me to carry out my project work effectively); and (3) project monitor (the degree to which the project manager monitors the progress of my project work).

With respect to motivational role functions, project members' perceptions of their managers along the following five dimensions were obtained: (1) provides support and recognition (the degree to which the project manager provides appreciation and recognition for work well done); (2) emphasizes performance (the degree to which the project manager emphasizes and maintains high standards of performance); (3) assigns challenging tasks (the degree to which my project manager assigns me to project tasks on which I am challenged to perform well); (4) sets goals and objectives (the degree to which my project manager sets specific project goals for me to achieve); and (5) provides feedback (the degree to which my project manager keeps me informed about how well I am performing my job).

As before, individual responses to these managerial functions were pooled across all project group members to derive aggregated measures of project managerial behavior. In addition, the homogeneity of project members' perceptions of these managerial variables were tested to check for the appropriateness of pooling, using the previously referenced ANOVA methods.

Project Performance

In each organization, project performance was measured by asking relevant higher level managers (at least one level above the project manager) to evaluate on a five-point scale whether a project team was performing above, below, or at the level he expected of them. By rating performance behavior relative to expectations, a normal distribution of performance scores was obtained across the five-point scale. Managers evaluated only those projects with which they were personally familiar and knowledgeable, averaging between four and five managers per project. Since evaluations showed a very strong internal consensus within each organization (Spearman-Brown reliabilities ranged from a low of .74 to a high of .93), individual ratings were averaged to yield highly reliable project performance scores.

RESULTS

The 71 projects have group longevity scores that range from a few months to almost 20 years, with an overall sample mean of 4.5 years. As described by Katz (1982a), low group longevity has generally been set at less than 1.5 years average tenure, moderate from 1.5 to 5.0 years, and high at 5.0 years or more. In the present sample, 22, 24, and 25 of the project groups fall within these low, moderate, and high group longevity categories, respectively.

The first critical question is whether any of the high longevity project groups are still considered high performing. A performance comparison across the group longevity continuum reveals that many of the project groups with high longevity levels are just as effective as project groups in the other two categories. In fact, the range of performance scores across the

three categories of group longevity are extremely comparable in the present sample of project groups. As a result, hypothesized differences between higher and lower performing project groups within each of the group longevity categories can be compared and appropriately tested.

Reactions to Project Task Characteristics

Generally speaking, overall project performance was not significantly related to the challenging task characteristics comprising project work. However, when these relationships are examined across the group longevity continuum, however, a clearer picture emerges. According to the moderated regressions in Table 1, the interactions of group longevity with project task characteristics significantly affect project performance. In almost each instance, the multiple R resulting from the moderated regression is significantly greater than the multiple R derived from the linear combination of task characteristic and group longevity.

Insert Table 1 About Here

These regression results suggest distinct differences among project groups with very different levels of group longevity. Specifically, the bivariate correlations of Table 1 strongly support the first hypothesis. The project performance-project task characteristic correlations show a strong positive association during the initial and moderate years of group longevity. After the fifth year of group longevity, however, the strengths of these relationships have deteriorated, even significantly negative in the case of autonomy and skill variety.

Reactions to Managerial Functions

Except for goal-setting dimension, project performance is not related to project member perceptions of their project managers across all 71 groups. When the moderating effects of group longevity are considered, however, a clearer pattern emerges. As hypothesized, the moderated regressions in Table 2 suggest that the influences of at least four managerial functions on project performance change significantly across the group longevity continuum. Furthermore, the bivariate correlations in Table 2 show that almost all of the managerial functions are significantly related to project performance only under conditions of high group longevity. This is precisely the condition in which the managerial functions were hypothesized to have their strongest effects, since that project members were unresponsive to the challenging nature of their project work during this period. Not only are most of the correlations positive and significant for high longevity groups, but they are significantly greater than the corresponding associations reported in the other two longevity categories.

DISCUSSION

The results of this study clearly emphasize the need to build frameworks that integrate project members' reactions to both their task and managerial settings. While the importance of such an interface has been previously recognized (e.g., House, 1971; Griffen, 1980; Schriesheim and DeNisi, 1981), the present findings suggest that the positive influences of challenging work and managerial behavior on project performance vary directly with the group's developmental stage, as measured by the group longevity variable. Furthermore, it seems that the positive effects of these two variables sets are highly interdependent such that managerial activity becomes relatively

more important for higher project performance as project members become less responsive to the challenging features of their project tasks.

More specifically, the performance of projects characterized by high levels of group longevity were not positively related to the challenging task dimensions; in fact, most of the relationships were highly negative. Most likely, project members have stabilized their role behaviors and have become less attentive to the demanding aspects of their work. In the words of Abelson (1976), they now have well-developed role scripts. They do not wish to reassess norms for they have come to believe in the appropriateness of their behaviors and in their understandings of the organization. As hypothesized, however, performance during this "unresponsive" stabilization period was very sensitive to project members perceptions of their project managers. Most of the relationships between performance and managerial behavior were considerably stronger during this period than in the two prior stages. In fact, the only variable consistently related to project performance across all three categories of longevity was the manager's goal-setting activity.

Based on the different performance reactions of project members to the task and managerial features of their work environments, different prescriptions for improving project performance appear necessary at different stages of group longevity. Essentially, the effectiveness of effort becomes significantly dependent on the working history of the group members. According to the present findings, any attempts which try to enhance project performance by adding challenge, meaning, and responsibility to the project activities of group members is likely to be more successful when members are still responsive to their tasks than when members are in the stabilization stage and are unresponsive to their tasks. On the other

hand, project managers who effectively deal with conflict, monitor project progress, emphasize performance, etc., are apt to be more successful in the management of long-tenured project teams in managing either low or moderate longevity groups.

What is implied by these findings is that the kind of environment necessary for maintaining high project performance will vary significantly with group longevity, requiring more active levels of managerial behavior with increasing stability in project membership. The degree to which a project manager is able to alter his or her activities to meet these new demands may strongly affect the degree to which the project manager is able to sustain project effectiveness. And if such role changes are too difficult to accomplish, then different project managers will be needed as project groups pass through different stages of development. In short, the effectiveness of any set of managerial activities is strongly dependent on the nature of the group being managed, and as argued by Pfeffer (1983), one of the most important characteristics of any project group lies in its demography or tenure distribution.

References are available from the author.

TABLE 1. Moderated Regression Results on Project Performance After Adding the Task Characteristic X Group Longevity Interaction Term Followed by Subgroup Analyses

Task Characteristics	Rlinear	Rmoderated	F-Value (Rmod., Rlin.)	Subgroup Correlations With Performance
Skill variety	.07	.22	3.15*	.24 ^a .32** ^a -.32** ^b
Task creativity	.09	.23	3.06*	.28 ^a .28** ^a -.26 ^b
Task significance:				
a) Organizational	.21	.28	2.81*	.31** ^a .47*** ^a -.10 ^b
b) Professional	.01	.05	0.37	.09 .10 -.19
c) Societal	.12	.17	0.95	.07 -.06 -.14
Autonomy	.06	.25	4.31**	-.05 .36*** ^a -.40** ^b
Job feedback	.10	.16	1.87	.11 .29* -.05
Group longevity (yrs) =	---	---	---	<1.5 1.5-5.0 ≥5.0
No. of project groups =	71	71	---	22 24 25

Note: In each row correlations with superscript "a" are significantly greater than correlations with superscript "b" at the .05 level or less.

TABLE 2. Moderated Regression Results on Project Performance
After Adding the Managerial Characteristic X Group
Longevity Interaction Term Followed by Subgroup Analyses

Managerial Characteristics	R _{linear}	R _{moderated}	F-Value (R _{mod.} -R _{lin.})	Subgroup Correlations With Performance
<u>Analytical</u>				
Technical competent	.08	.15	1.20	.03 -.02 .24
Idea generator & reviewer	.01	.07	0.34	-.07 -.09 .19
<u>Informational</u>				
Disseminator of information	.09	.21	2.96*	-.26 ^b -.19 ^b .23 ^a
Organizationally connected	.17	.22	1.07	.08 ^b -.06 ^b .45 ^{***a}
Professionally connected	.13	.15	0.39	.07 .09 .18
<u>Decisional</u>				
Disturbance handler	.14	.19	1.26	.02 ^b -.15 ^b .43 ^{***a}
Resource allocator	.27	.28	0.13	.23 .20 .37 ^{**}
Project monitor	.03	.21	3.12*	-.08 ^b -.06 ^b .33 ^{**a}
<u>Motivational</u>				
Provides support and recognition	.08	.20	2.88*	-.22 ^b -.23 ^b .18 ^a
Assigns challenging tasks	.02	.07	0.31	-.18 ^{**} .19 .10
Sets goals & objectives	.37	.37	0.35	.35 ^{**} .46 ^{**} .29*
Provides feedback	.04	.22	3.04*	-.13 ^b -.26 ^b .31 ^{**a}
Emphasizes performance	.18	.19	0.30	.05 .16 .34 ^{**}
Group longevity (yrs) =	---	---	---	<1.5 1.5-5.0 ≥5.0
No. of project groups =	71	71	---	22 24 25

Note: In each row, correlations with superscript "a" are significantly greater than correlations with superscript "b" at the p .10 level or less.

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